Portland Cement Maximum Available Control Technology (MACT) Training (Subpart LLL)

1

Objectives

- Review major features of MACT.
- Help you understand and interpret MACT.
- Assist you with planning future cement plant evaluations.

2

Training Outline

- 1. Process description
- 2. General MACT discussion
- 3. PM requirements
- 4. Opacity requirements
- 5. D/F requirements
- 6. THC requirements
- 7. Compliance evaluation guide
- 8. Recap

* MACT regulates approximately 120 major & area sources nationwide

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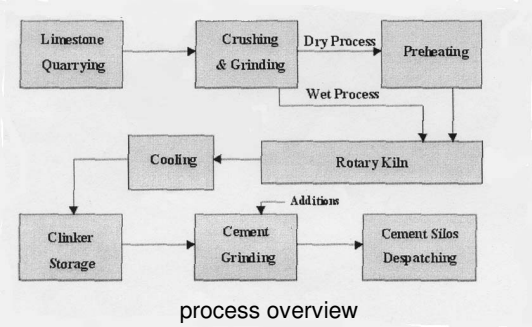
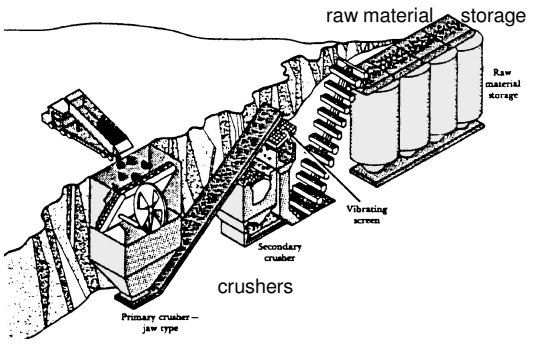
1. Portland Cement Process Description

4



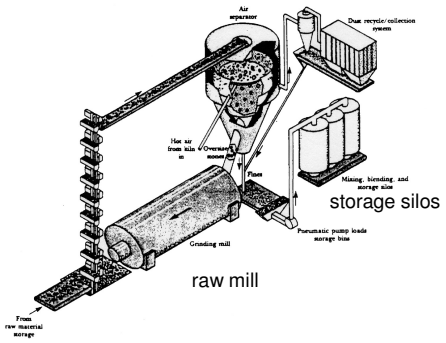
process overview

5

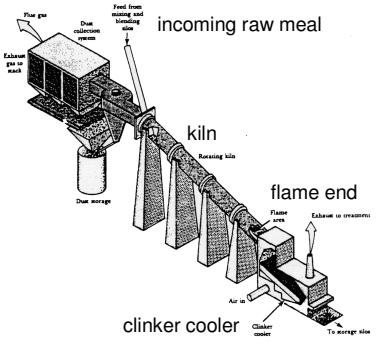


crushers

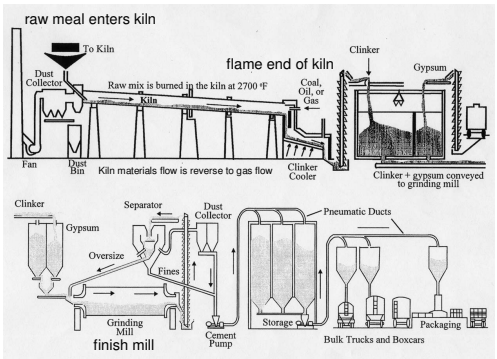
6


storage silos
raw mill

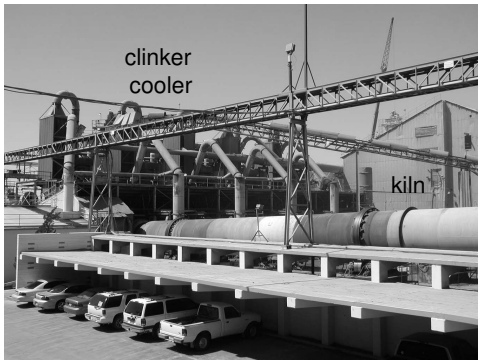
7


incoming raw meal
kiln
flame end
clinker cooler

8


raw meal enters kiln
To Kiln
flame end of kiln
Clinker
Gypsum
Dust Collector
Raw mix is burned in the kiln at 2700 °F
Kiln
Coal, Oil, or Gas
Fan
Dust Bin
Kiln materials flow is reverse to gas flow
Clinker Cooler
Clinker + gypsum conveyed to grinding mill
Separator
Pneumatic Ducts
Oversize
Fines
Grinding Mill
Cement Pump
Storage
Packaging
Bulk Trucks and Boxcars
finish mill

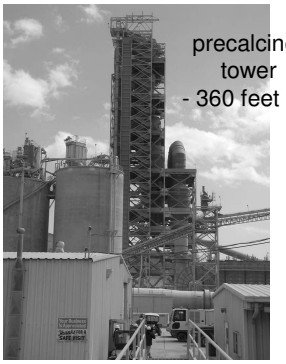
9


clinker
cooler
kiln

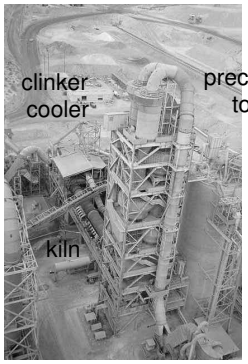
10


clinker
cooler

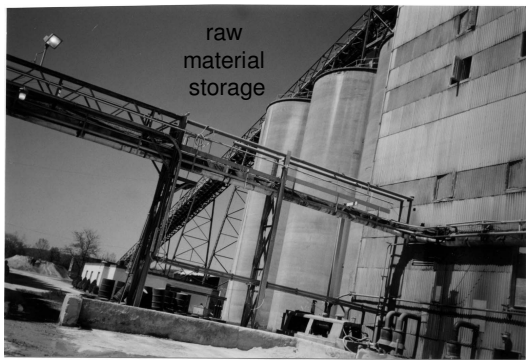
11


precalciner
tower
- 360 feet tall

12


clinker
cooler
precalciner
tower
kiln

13


raw
material
storage

14


finish
cement
silos

15

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2. General MACT Discussion

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Finding Your Way Around the MACT

- § 63.1340 - Applicability
- § 63.1341 - Definitions
- § 63.1342 - Emission standards & operating limits
- § 63.1349 - Monitoring & compliance provisions
- § 63.1353 - Notification, reporting & recordkeeping

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MACT Compliance Dates

- June 14, 2002 for existing portland cement plants, both major & area sources.
- June 14, 1999 for newly constructed or reconstructed affected sources (plant components subject to Subpart LLL) if construction commenced after March 24, 1998 or immediately upon startup of operations, whichever is later.
  (40 CFR §63.1351).

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Initial Notifications

- Initial notification if subject to Subpart LLL
  - Initial startup before 6/14/99, submit no later than 10/12/99.
  - Initial startup after 6/14/99, submit 120 days after becoming subject to this Subpart.
- Notification of intent to construct or reconstruct
  - If plan to construct or reconstruct a new affected source that is a major or area source of HAPs, submit as soon as possible before construction begins.
- Notification of startup
  - If have been required to submit a notice of intent to construct or reconstruct, deliver or postmark within 15 days after startup.

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Initial MACT Compliance

- Prepare & submit operation and maintenance (O&M) plan (to the appropriate regulatory agency)
  - O&M procedures for affected sources & control devices to meet emission & operating limits
  - Corrective actions for visible emissions, daily opacity check
  - Procedures for kiln or in-line kiln/raw mill inspections
  - Periodic opacity monitoring procedures for materials processing (§63.1350(a))
- Initial performance tests
  - By December 14, 2002 (within 180 days - §63.7)
  - Notification 60 days prior to test date (§63.7(b))

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Continuous Compliance

- Comply with Operation and Maintenance (O&M) Plan.
- Conduct performance tests at specified intervals.
- Maintain established emission & operating limits.
- Install & maintain monitors, conduct daily & periodic tests.
- Submit required notifications & reports, maintain records.

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Definitions 1

- Major source = any stationary source or group of sources located within a contiguous area and under common control, that emits or has the potential to emit (considering controls), in the aggregate, 10 tons per year or more of any hazardous air pollutant (HAP) or 25 tons per year or more of any combination of hazardous air pollutants (§63.2).

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Definitions 2

- Greenfield equipment = a kiln, in-line kiln/raw mill, or raw material dryer, construction commenced after March 24, 1998 at a plant with no prior operating kiln (§63.1341).
- New brownfield equipment = a kiln, in-line kiln/raw mill or raw material dryer, construction commenced after March 24, 1998 at a plant with kilns and/or in-line kiln/raw mills operating prior to March 24, 1998. Same standards as existing or reconstructed equipment at major sources.

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Definitions 3

- Alkali bypass = a duct between the feed end of the kiln and the pre-heater tower though which a portion of the kiln exit gas stream is withdrawn and quickly cooled by air or water to avoid excessive buildup of alkali, chloride and/or sulfur on the raw feed.
- In-line kiln/raw mill = a system where a dry kiln system is integrated with the raw mill so that all or a portion of the kiln exhaust gases are used to perform the drying operation of the raw mill, with no auxiliary heat source used. In this system, the kiln can operate without the raw mill but the raw mill cannot operate without the kiln operating, so the raw mill does not generate a separate exhaust stream.

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Affected Plant Components for Subpart LLL

Plant Component	PM, Opacity	D/F	THC
Kiln, In-line kiln/raw mill	Major sources	Major & area sources	New greenfield at major, area sources
Alkali bypass	Major sources	Major & area sources	New greenfield at major, area sources
Clinker cooler	Major sources		
Raw mills	Major sources		
Finish mills	Major sources		
Raw material dryers	Major sources		New greenfield at major, area sources
Raw material, clinker cooler, or finished cement storage bins	Major sources		
Conveying systems	Major sources		
Bagging systems	Major sources		
Loading/unloading systems	Major sources		

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Related Requirements

- Part 60 (NSPS) Subpart F
  - Area source plant components other than kiln, in-line kiln/raw mill, alkali bypass (§63.1340(b), §60.60(a))
- Part 63 Subpart EEE
  - Kilns & in-line kiln/raw mills that burn hazardous waste (§63.1340(b)(1)). If a kiln stops burning hazardous waste it remains subject to Subpart EEE but is allowed to satisfy the monitoring requirements of Subpart LLL.
- Part 60 (NSPS) Subpart OOO
  - Primary & secondary crushers (wherever located), or other equipment of an on-site nonmetallic mineral processing plant preceding portland cement plant raw material storage (§63.1340(b)(9)(c) rev. 4/5/02, §60.670(a))
- Part 60 (NSPS) Subpart Y
  - Coal mills, except that kiln emissions used to dry the coal are regulated under Subpart LLL (§63.1340(b), §60.250(a), 9/4/02 Applicability Determination)

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NSPS – MACT Comparison

- New Source Performance Standards (40 CFR 60, Subpart F) set PM & opacity standards for all cement kilns constructed or reconstructed after August 17, 1971.
- MACT supersedes the NSPS for major sources. Many area source plant components, and kilns that burn hazardous waste must still comply with the NSPS (§63.1340(b)(1), §63.1356).
- Things that haven't changed
  1. PM emission limits
  2. Opacity emission limits
  3. Determination of PM compliance (Method 5)

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MACT Emission Limits

- The MACT establishes emission limits for:
  1. Total particulate matter (PM), surrogate for HAP metals
  2. Opacity
  3. Dioxin/furans (D/F)
  4. Total hydrocarbons (THC), surrogate for organic HAPs
- For existing plants meeting NSPS, D/F is the only new emission limit. For greenfield equipment, the THC limit also applies.

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Portland Cement Key Policy Issues

- Performance Testing
  - Takes place at representative conditions
  - Retesting required for a change in operations that may adversely affect compliance
  - Opacity waivers granted for inaccessible, totally enclosed, and little used affected plant components
- Alternative Monitoring
  - Requests primarily involve Method 22 building monitoring for opacity
  - Building monitoring granted through reg amendment for partial or unenclosed conveying system transfer points (CSTP), also eliminated monitoring for totally enclosed CSTP

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Portland Cement Key Policy Issues

- Commingled Emissions
  - Commingled emissions from affected plant components are subject to most stringent limit
  - Generally impacts opacity e.g. 20% kiln + 10% clinker cooler = 10% commingled
- Rerouted Emissions
  - Typically routed from kiln or clinker cooler to raw mill or coal mill & used to preheat incoming materials
  - Rerouted emissions generally remain subject to portland cement MACT, even if discharged from coal mill subject to NSPS Subpart Y
  - Waiver requests dealt with on case-by-case basis e.g. D/F performance test waiver granted for 1/10 of kiln emissions routed through coal mill equipped with temperature alarm

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Portland Cement Key Policy Issues

- PM continuous emission monitoring system (CEMS)
  - MACT requires that affected sources implement PM CEMS
  - PS-11 and QA Procedure 2 promulgated 1/04
  - Monitoring requirements deferred until further rulemaking

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Portland Cement Key Policy Issues

- Petroleum coke fuel
  - Waste product from refineries, burned as a mix with pulverized coal
  - Transported by barge, truck transport typically not cost effective
  - Costs ½ as much as coal
  - High calorific value ~ 50% greater than coal
  - Ash content much lower
  - Sulfur content much higher ~ 5 - 6% sulfur vs 1% for coal
  - Cement plant scrubbing efficiency although high may be insufficient to maintain 40 tons/yr PSD limit for sulfur

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3. PM Requirements

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Emission Limit Summary

Plant Component	PM	Opacity	D/F	THC
Kiln, In-line kiln/raw mill	0.15 kg/Mg dry feed	Opacity <= 20%	0.2 ng TEQ/dscm 0.4 ng TEQ/dscm	50 ppmvd for new greenfield
Alkali bypass		Opacity <= 20%		
Clinker cooler	0.05 kg/Mg dry feed	Opacity <= 10%		
Raw mill		Opacity <= 10%		
Finish mill		Opacity <= 10%		
Raw material dryer		Opacity <= 10%		50 ppmvd for new greenfield
Raw material, clinker cooler, or finished product storage		Opacity <= 10%		
Conveyor transfer points		Opacity <= 10%		
Bagging systems		Opacity <= 10%		
Bulk loading & unloading systems		Opacity <= 10%		

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PM Emission Limits

(at major sources, same as NSPS)

Components	Emission limits
Kiln In-line kiln/raw mill	0.15 kilogram/metric ton (kg/Mg) dry feed (0.30 lb/ton dry feed)
Clinker cooler	0.05 kg/Mg dry feed (0.10 lb/ton dry feed)

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PM Performance Testing at Representative Conditions

- Performance testing takes place at "representative performance conditions" (§63.1349(b) rev. 4/05/02, §63.7(e)).
- A new performance test is required for a change in operations that may adversely affect compliance (§63.1349(e) rev. 4/05/02 & Preamble, 7/05/02 Preamble).
- The facility bears the burden of demonstrating that its performance testing conditions remain representative (7/05/02 Preamble).
- The inspector will need to examine whether plant operating conditions remain the same. Differences in plant operation do not automatically require a new performance test, but may prompt the inspector to inquire about & document the facility's rationale for not conducting a new test.

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Performance Testing for a Change in Operations

For a change in operations that may adversely affect compliance, the source may operate for up to 360 hours in advance of required PM & D/F performance testing, provided that the source:

- Provides the regulatory agency 60 days notice of the change, or as soon as practicable.
- Submits a test plan upon request, prior to testing.
- Completes required performance tests within 360 hours (§63.1349(e)(3) rev. 12/6/02).
- Documents the performance test results in a test report submitted by the 60th day following completion (§63.10(d)(2)).

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Detecting a Change in Operations

- Kiln production rate
  - Ask plant for
    - production rate during the performance test
    - monthly production rate over last 5 years, or
    - monthly/annual hours of operation & total production
    - stack test report showing production rate during the test
  - Compare these & look for inconsistencies
- Fuel usage
  - Ask plant for
    - records of fuel being fired by kiln
  - Look for trends or changes over the course of a month or year
- Kiln gas routing
  - Ask plant for
    - capital authorization requests
    - explanation of gas routing (generally from raw meal feed end of kiln or clinker cooler to raw mill or coal mill)
  - Review for plant configuration & possible changes
    - performance test process diagram & description in the test report
    - operations & maintenance (O&M) plan
    - capital authorization requests
  - Pay attention to any irregularities or inconsistencies

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Performance Test Plan/Report

- Compile plan prior to testing & complete test report of results:
  1. Description of the process & the air pollution control system
  2. Sampling location descriptions
  3. Description of the sampling & analytical procedures & any modifications to standard procedures
  4. Test results
  5. Quality assurance procedures & results
  6. Records of operating conditions during the test, preparation of standards, & calibration procedures
  7. Raw data sheets of field sampling & field & lab analyses
  8. Documentation of calculations
  9. All data recorded & used to establish parameters for compliance monitoring
  10. Any other information required by the test method

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Performance Test Summary

Pollutant	Components	Method or Monitor	Frequency
PM	New & existing kiln or in-line kiln/raw mill, and clinker cooler	EPA Method 5	Initially and every 5 years
Opacity	New & existing kiln or in-line kiln/raw mill (20%) and clinker cooler (10%)	COM or EPA Method 9	Initially at same time as Method 5
Opacity	New & existing raw & finish mills, raw material dryers & material handling processes (10%)	EPA Method 9	Initially and every 5 years
D/F	New & existing kiln or in-line kiln/raw mill	EPA Method 23	Initially and every 30 months
THC	New greenfield kiln or greenfield in-line kiln/raw mill	THC CEM	Initially

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PM Performance Test

Components	Interval	Method
New & existing kiln or in-line kiln/raw mill, and clinker cooler	Initially and every 5 years	EPA Method 5
• Average of 3 runs of at least 1 hour each, minimum sample volume 0.85 dry standard cubic meter (dscm), *operating at representative conditions* (§63.1349(b)(1)(i) rev. 4/05/02)).		

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Notes on PM Performance Testing

- Test in-line kiln/raw mill both with & without raw mill operating, under representative operating conditions (§63.1349(b), Table 1).
- Simultaneously test & combine emissions for main exhaust and alkali bypass (if present) (§63.1349(b), Table 1).

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PM Monitoring Requirements

- Operations and maintenance (O&M) plan for all affected sources & control devices
- §63.1350(k) requires that affected sources implement a PM continuous emission monitoring system (CEMS). This monitoring requirement has been deferred indefinitely.
- §63.1357 provides for a temporary PM/Opacity exemption while conducting correlation testing of the PM CEMS (when installed) with Method 5 results.

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PM Notifications

- Notification of intent to conduct performance test
  - 60 days before the test
- Site-specific test plan
  - 60 days before the test on request
- Notification of rescheduling of performance test
  - specify the rescheduled test date ASAP prior to original date
- Notification of compliance status incl. performance test results report
  - 60 days after performance test completion
- Notification of actual emissions data or other corrected information
  - submit with the first compliance status notification

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PM Reporting Requirements

- Report of performance test results
  - submit with notification of compliance status
- Progress reports
  - per written compliance extension, if given
- Startup, shutdown, or malfunction reports
  - semiannually when consistent with SS&M plan, within 2 working days when not
- Summary report
  - semiannually

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PM Recordkeeping Requirements

- 5 year retention, 2 years onsite
- Maintain records for each affected source
  - Startup, shutdown, operational malfunction
  - Air pollution control equipment malfunction
  - Air pollution control equipment maintenance
  - Variations from startup, shutdown, and malfunction plan (SS&M)
  - Demonstrations of conformance with SS&M
  - Results of performance tests
  - Documentation supporting initial notifications and notifications of compliance status. Applicability determination, incl. supporting analyses

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4. Opacity Requirements

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Emission Limit Summary

Plant Component	PM	Opacity	D/F	THC
Kiln, In-line kiln/raw mill	0.15 kg/Mg dry feed	Opacity <= 20%	0.2 ng TEQ/dscm 0.4 ng TEQ/dscm	50 ppmvd for new greenfield
Alkali bypass		Opacity <= 20%		
Clinker cooler	0.05 kg/Mg dry feed	Opacity <= 10%		
Raw mill		Opacity <= 10%		
Finish mill		Opacity <= 10%		
Raw material dryer		Opacity <= 10%		50 ppmvd for new greenfield
Raw material, clinker cooler, or finished product storage		Opacity <= 10%		
Conveyor transfer points		Opacity <= 10%		
Bagging systems		Opacity <= 10%		
Bulk loading & unloading systems		Opacity <= 10%		

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Opacity Emission Limits

(at major sources, same as NSPS)

Components		Emission Limits
Kiln Alkali bypass	In-line kiln/raw mill	Opacity no greater than 20%
Clinker cooler Raw mill Finish mill Raw material dryer Raw material storage Clinker storage	Finished product storage Conveyor transfer points Bagging systems Bulk loading systems Unloading systems	Opacity no greater than 10%

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Performance Test Summary

Pollutant	Components	Method or Monitor	Frequency
PM	New & existing kiln or in-line kiln/raw mill, and clinker cooler	EPA Method 5	Initially and every 5 years
Opacity	New & existing kiln or in-line kiln/raw mill (20%) and clinker cooler (10%)	COM or EPA Method 9	Initially at same time as Method 5
Opacity	New & existing raw & finish mills, raw material dryers & material handling processes (10%)	EPA Method 9	Initially and every 5 years
D/F	New & existing kiln or in-line kiln/raw mill	EPA Method 23	Initially and every 30 months
THC	New greenfield kiln or greenfield in-line kiln/raw mill	THC CEM	Initially

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Opacity Performance Test 1

Components	Interval	Method
New & existing kiln or in-line kiln/raw mill (20%) and clinker cooler (10%)	Initially at same time as Method 5	Continuous opacity monitor (COM) or EPA Method 9

- Use maximum 6 minute average opacity during 3 Method 5 runs to demonstrate initial compliance.
- Can use Method 9 (visual) instead of COM if:
  - using a fabric filter or ESP with multiple stacks.
  - the control device exhausts through a monovent.
  - it is infeasible to use COM according to Performance Specification (PS-1) (§63.1349(b)(vi)).

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Opacity Performance Test 2

Components	Interval	Method
New & existing raw & finish mills, raw material dryers & material handling processes (10%)	Initially and every 5 years	EPA Method 9

- Use maximum 6 minute average opacity during 3 Method 5 runs to demonstrate initial compliance, *operating at representative conditions* (§63.1349(b)(2) rev. 4/05/02).
- Test for 3 hours, may be reduced to 1 hour if there are no individual readings greater than 10% and no more than 3 readings of 10%.

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Notes on Opacity Performance Testing

- Test in-line kiln/raw mill) both with & without raw mill operating, under representative operating conditions (§63.1349(b), Table 1).
- Simultaneously test and combine emissions for main exhaust & alkali bypass (if present) (§63.1349(b), Table 1).

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Opacity/VE Notifications 1

- Notification of intent to conduct performance test
  - 60 days before the test
- Site-specific test plan
  - 60 days before the test on request
- Notification of rescheduling of performance test
  - specify the rescheduled test date ASAP prior to original date
- Notification for sources with continuous monitoring system (CMS)
  - 60 days prior to performance test
- COM performance evaluation
  - 15 days prior to performance test
- Notification of opacity & visible emissions (VE) observations
  - with notification of performance test 60 days prior, otherwise 30 days prior

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Opacity/VE Notifications 2

- Notification of compliance status incl. performance test results report
  - 60 days after performance test completion
- Notification of compliance status incl. CMS performance evaluation results report
  - with performance test report or 60 days after performance evaluation completion
- Notification of compliance status incl. opacity & VE observation report
  - with performance test results 60 days after completion, or 30 day after completion of observation
- Notification of actual emissions data or other corrected information
  - submit with the first compliance status notification

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Monitoring Requirements Monitors & Methods Summary

Reqm't	Monitor	Method	Component	Source
Opacity	COM	9	Kiln, in-line kiln/raw mill, clinker cooler	major
VE	COM BLDS	22 9	Raw & finish mills	major
VE		22 9	Materials handling	major
D/F	Temp		Kiln, in-line kiln/raw mill	major area
THC	CEM		New greenfield Kiln, in-line kiln/raw mill, raw material dryer	major area

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Opacity/VE Monitoring Requirements 1

- Operations and maintenance (O&M) plan for all affected sources & control devices
- Kilns, in-line kiln/raw mills (including alkali bypass) & clinker coolers at major sources
  - Option 1: Continuous opacity monitor (COM)
  - Option 2: Daily Method 9 visual opacity test (for multiple stacks, monovent or COM infeasible).
- Raw mills, finish mills at major sources
  - Option 1: Daily 6 minute Method 22 visible emissions test
  - Option 2: Continuous opacity monitor (COM)
  - Option 3: Bag leak detector system (BLDS)

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Opacity/VE Monitoring Requirements 2

- Raw material dryers, raw material storage, clinker, finished product storage bins, conveying transfer points (excluding those totally enclosed), bagging systems, and bulk loading and unloading systems at major sources
  - Monthly Method 22 visible emissions (VE) test, extended to semiannually and then annually for no VE observed.

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Opacity Reporting Requirements

- Report of performance test results, report of opacity/VE observations
  - submit with notification of compliance status
- CMS performance evaluation
  - with performance test results
- COM performance evaluation
  - at least 15 days before the performance test
- Progress reports
  - per written compliance extension, if given
- Startup, shutdown, or malfunction reports
  - semiannually when consistent with SS&M plan, within 2 working days when not
- Summary report
  - semiannually
- Excess emissions and continuous monitoring system performance report
  - semiannually along with the summary report for CMS-indicated noncompliance, or CEMS or CMS downtime 10% or greater

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Opacity Recordkeeping Requirements

- 5 year retention, 2 years onsite
- Maintain records for each affected source
  - Startup, shutdown, operational malfunction
  - Air pollution control equipment malfunction
  - Air pollution control equipment maintenance
  - Variations from startup, shutdown, and malfunction plan (SS&M)
  - Demonstrations of conformance with SS&M
  - Periods of CMS malfunctioning or inoperative
  - Results of performance tests, CMS performance evaluations, opacity/VE observations
  - CMS calibrations, adjustments, maintenance
  - Documentation supporting initial notifications and notifications of compliance status
  - Applicability determination, incl. supporting analyses

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Recordkeeping Requirements for CMS

- Maintain records for each affected source
  - Required CMS measurements
  - Periods CMS inoperative
  - Periods CMS out of control
  - Periods of excess emissions and parameter monitoring exceedances incl. SS&M
  - Nature and cause of malfunction (if known)*
  - Corrective action or preventive measures taken*
  - Repairs or adjustments*
  - Total process operating time by reporting period
  - Quality control program procedures for:
    a) Initial and subsequent calibration of each CMS
    b) Determination and adjustment of CMS calibration drift

* may use the SS&M plan instead, if inclusive

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5. D/F Requirements

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Emission Limit Summary

Plant Component	PM	Opacity	D/F	THC
Kiln, In-line kiln/raw mill	0.15 kg/Mg dry feed	Opacity <= 20%	0.2 ng TEQ/dscm 0.4 ng TEQ/dscm	50 ppmvd for new greenfield
Alkali bypass		Opacity <= 20%		
Clinker cooler	0.05 kg/Mg dry feed	Opacity <= 10%		
Raw mill		Opacity <= 10%		
Finish mill		Opacity <= 10%		
Raw material dryer		Opacity <= 10%		50 ppmvd for new greenfield
Raw material, clinker cooler, or finished product storage		Opacity <= 10%		
Conveyor transfer points		Opacity <= 10%		
Bagging systems		Opacity <= 10%		
Bulk loading & unloading systems		Opacity <= 10%		

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D/F Emission/Operating Limits

Components	Emission Limits
Kiln In-line kiln/raw mill (major & area sources) ●Separate limits for raw mill operating & not operating, and for alkali bypass ●see §63.1344(c-e) for carbon injection requirements	0.2 ng dioxin toxicity equivalent (TEQ)/dry standard cubic meter (dscm) ***or*** 0.4 ng TEQ/dscm if the average PM control device (PMCD) temperature is 204° C (400° F) or less, corrected to 7% oxygen ***and*** the 3 hour rolling average PMCD inlet temperature is no greater than the temperature established during the performance test (§63.1344)

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D/F Performance Testing at Representative Conditions

- Performance testing takes place at "representative performance conditions" (§63.1349(b) rev. 4/05/02, §63.7(e)).
- A new performance test is required, and the temperature limit(s) reestablished for D/F, for a change in operations that may adversely affect compliance (§63.1349(e) rev. 4/05/02 & Preamble, 7/05/02 Preamble).
- The facility bears the burden of demonstrating that its performance testing conditions remain representative (7/05/02 Preamble).
- The inspector will need to examine whether plant operating conditions remain the same. Differences in plant operation do not automatically require a new performance test, but may prompt the inspector to inquire about and document the facility's rationale for not conducting a new test.

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Performance Testing for a Change in Operations

For a change in operations that may adversely affect compliance, the source may operate for up to 360 hours in advance of required PM & D/F performance testing, provided that the source:

- Provides the regulatory agency 60 days notice of the change, or as soon as practicable.
- Submits a test plan upon request, prior to testing.
- Completes required performance tests within 360 hours (§63.1349(e)(3) rev. 12/6/02).
- Documents the performance test results in a test report submitted before by the 60th day following completion (§63.10(d)(2)).

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Performance Test Summary

Pollutant	Components	Method or Monitor	Frequency
PM	New & existing kiln or in-line kiln/raw mill, and clinker cooler	EPA Method 5	Initially and every 5 years
Opacity	New & existing kiln or in-line kiln/raw mill (20%) and clinker cooler (10%)	COM or EPA Method 9	Initially at same time as Method 5
Opacity	New & existing raw & finish mills, raw material dryers & material handling processes (10%)	EPA Method 9	Initially and every 5 years
D/F	New & existing kiln or in-line kiln/raw mill	EPA Method 23	Initially and every 30 months
THC	New greenfield kiln or greenfield in-line kiln/raw mill	THC CEM	Initially

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D/F Performance Test

Components	Interval	Method
New & existing kiln or in-line kiln/raw mill	Initially and every 30 months	EPA Method 23

- Average of 3 runs of at least 3 hours each, minimum sample volume 90 dry specific cubic feet (dscf), *operating at representative conditions* (§63.1349(b)(3) rev. 4/05/02).
- Continuously record temperature at inlet to kiln PMCD, in-line kiln/raw mill PMCD and/or alkali bypass PMCD.
- Calculate 1 minute average temperature for each test minute and average temperature per run, and calculate average of run average temperatures. This determines the applicable temperature limit (see §63.1344(b))
- Include all in performance test report (§63.1349(b)(3)).
- See §63.1349(b)(3)(v-vi) for carbon injection.

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Notes on D/F Performance Testing

- Test in-line kiln/raw mill both with & without raw mill operating, under representative operating conditions (§63.1349(b), Table 1).
- Simultaneously test and combine emissions for main exhaust and alkali bypass (if present) (§63.1349(b), Table 1).
- Alkali bypass (if present) may be tested with the raw mill operating or not operating (§63.1349(b)(3) rev. 4/5/02).

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D/F Notifications

- Notification of intent to conduct performance test
  - 60 days before the test
- Site-specific test plan
  - 60 days before the test on request
- Notification of rescheduling of performance test
  - specify the rescheduled test date ASAP prior to original date
- Notification for sources with CMS
  - 60 days prior to performance test
- Notification of compliance status incl. performance test results report
  - 60 days after performance test completion
- Notification of compliance status incl. CMS performance evaluation results report
  - with performance test report or 60 days after performance evaluation completion
- Notification of actual emissions data or other corrected information
  - submit with the first compliance status notification

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Monitoring Requirements Monitors & Methods Summary

Reqm't	Monitor	Method	Component	Source
Opacity	COM	9	Kiln, in-line kiln/raw mill, clinker cooler	major
VE	COM BLDS	22 9	Raw & finish mills	major
VE		22 9	Materials handling	major
D/F	Temp		Kiln, in-line kiln/raw mill	major area
THC	CEM		New greenfield Kiln, in-line kiln/raw mill, raw material dryer	major area

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D/F Monitoring Requirements

- Operations and maintenance (O&M) plan for all affected sources & control devices
- Kilns, in-line kiln/raw mills (including alkali bypass) at major & area sources
  - Annual combustion system inspection.
  - Continuous temperature monitoring and recording system at PM control device (PMCD) inlet.

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D/F Reporting Requirements

- Report of performance test results
  - submit with notification of compliance status
- CMS performance evaluation
  - with performance test results
- Progress reports
  - per written compliance extension, if given
- Startup, shutdown, or malfunction reports
  - semiannually when consistent with SS&M plan, within 2 working days when not
- Summary report
  - semiannually
- Excess emissions and continuous monitoring system performance report
  - semiannually along with the summary report for CMS-indicated noncompliance, or CEMS or CMS downtime 10% or greater

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D/F Recordkeeping Requirements

- 5 year retention, 2 years onsite
- Maintain records for each affected source
  - Startup, shutdown, operational malfunction
  - Air pollution control equipment malfunction
  - Air pollution control equipment maintenance
  - Variations from startup, shutdown, and malfunction plan (SS&M)
  - Demonstrations of conformance with SS&M
  - Periods of CMS malfunctioning or inoperative
  - Results of performance tests, CMS performance evaluations
  - CMS calibrations, adjustments, maintenance
  - Documentation supporting initial notifications and notifications of compliance status
  - Applicability determination, incl. supporting analyses

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Recordkeeping Requirements for CMS

- Maintain records for each affected source
  - Required CMS measurements
  - Periods CMS inoperative
  - Periods CMS out of control
  - Periods of excess emissions and parameter monitoring exceedances incl. SS&M
  - Nature and cause of malfunction (if known)*
  - Corrective action or preventive measures taken*
  - Repairs or adjustments*
  - Total process operating time by reporting period
  - Quality control program procedures for:
    a) Initial and subsequent calibration of each CMS
    b) Determination and adjustment of CMS calibration drift

* may use the SS&M plan instead, if inclusive

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6. THC Requirements

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Emission Limit Summary

Plant Component	PM	Opacity	D/F	THC
Kiln, In-line kiln/raw mill	0.15 kg/Mg dry feed	Opacity <= 20%	0.2 ng TEQ/dscm 0.4 ng TEQ/dscm	50 ppmvd for new greenfield
Alkali bypass		Opacity <= 20%		
Clinker cooler	0.05 kg/Mg dry feed	Opacity <= 10%		
Raw mill		Opacity <= 10%		
Finish mill		Opacity <= 10%		
Raw material dryer		Opacity <= 10%		50 ppmvd for new greenfield
Raw material, clinker cooler, or finished product storage		Opacity <= 10%		
Conveyor transfer points		Opacity <= 10%		
Bagging systems		Opacity <= 10%		
Bulk loading & unloading systems		Opacity <= 10%		

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THC Emission Limits

Components	Emission Limits
New greenfield kiln New greenfield in-line kiln/raw mill New greenfield raw material dryer (major & area sources)	50 parts per million by volume dry (ppmvd), as propane, corrected to 7% oxygen

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Performance Test Summary

Pollutant	Components	Method or Monitor	Frequency
PM	New & existing kiln or in-line kiln/raw mill, and clinker cooler	EPA Method 5	Initially and every 5 years
Opacity	New & existing kiln or in-line kiln/raw mill (20%) and clinker cooler (10%)	COM or EPA Method 9	Initially at same time as Method 5
Opacity	New & existing raw & finish mills, raw material dryers & material handling processes (10%)	EPA Method 9	Initially and every 5 years
D/F	New & existing kiln or in-line kiln/raw mill	EPA Method 23	Initially and every 30 months
THC	New greenfield kiln or greenfield in-line kiln/raw mill	THC CEM	Initially

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THC Performance Test

Components	Interval	Method
New greenfield kiln or greenfield in-line kiln/raw mill	Initially	THC continuous emission monitor (CEM) (EPA Performance Specification 8A)
● Calculate average THC from 1 minute averages taken over 3 hour period (§63.1349(d)). ● Test in-line kiln/raw mill both with and without raw mill operating, under representative operating conditions (§63.1349(b), Table 1).		

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THC Notifications

- Notification of intent to conduct performance test
  - 60 days before the test
- Site-specific test plan
  - 60 days before the test on request
- Notification of rescheduling of performance test
  - specify the rescheduled test date ASAP prior to original date
- Notification for sources with CMS
  - 60 days prior to performance test
- Notification of compliance status incl. performance test results report
  - 60 days after performance test completion
- Notification of compliance status incl. CMS performance evaluation results report
  - with performance test report or 60 days after performance evaluation completion
- Notification of actual emissions data or other corrected information
  - submit with the first compliance status notification

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Monitoring Requirements Monitors & Methods Summary

Reqm't	Monitor	Method	Component	Source
Opacity	COM	9	Kiln, in-line kiln/raw mill, clinker cooler	major
VE	COM BLDS	22 9	Raw & finish mills	major
VE		22 9	Materials handling	major
D/F	Temp		Kiln, in-line kiln/raw mill	major area
THC	CEM		New greenfield Kiln, in-line kiln/raw mill, raw material dryer	major area

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THC Monitoring Requirements

- Operations and maintenance (O&M) plan for all affected sources & control devices
- New greenfield kilns, in-line kiln/raw mills, raw material dryers at major and area sources
  - Continuous emission monitor (CEM)

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THC Reporting Requirements

- Report of performance test results
  - submit with notification of compliance status
- CMS performance evaluation
  - with performance test results
- Progress reports
  - per written compliance extension, if given
- Startup, shutdown, or malfunction reports
  - semiannually when consistent with SS&M plan, within 2 working days when not
- Summary report
  - semiannually
- Excess emissions and continuous monitoring system performance report
  - semiannually along with the summary report for CMS-indicated noncompliance, or CEM or CMS downtime 10% or greater

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THC Recordkeeping Requirements

- 5 year retention, 2 years onsite
- Maintain records for each affected source
  - Startup, shutdown, operational malfunction
  - Air pollution control equipment malfunction
  - Air pollution control equipment maintenance
  - Variations from startup, shutdown, and malfunction plan (SS&M)
  - Demonstrations of conformance with SS&M
  - Periods of CMS malfunctioning or inoperative
  - Results of performance tests, CMS performance evaluations
  - CMS calibrations, adjustments, maintenance
  - Documentation supporting initial notifications and notifications of compliance status
  - Applicability determination, incl. supporting analyses

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Recordkeeping Requirements for CMS

- Maintain records for each affected source
  - Required CMS measurements
  - Periods CMS inoperative
  - Periods CMS out of control
  - Periods of excess emissions and parameter monitoring exceedances incl. SS&M
  - Nature and cause of malfunction (if known)*
  - Corrective action or preventive measures taken*
  - Repairs or adjustments*
  - Total process operating time by reporting period
  - Quality control program procedures for:
    a) Initial and subsequent calibration of each CMS
    b) Determination and adjustment of CMS calibration drift

* may use the SS&M plan instead, if inclusive

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7. Compliance Evaluation Guide

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Compliance Evaluation Guide Summary

- Required Plant Submissions
- Pre-evaluation Review
- On-site Activity
- Detecting a Change in Operations
- On-site Record Checks

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Required Plant Submissions

- Notifications
  - Initial
  - Performance test & site-specific plan
- Reports
  - Performance test plan/report
  - Summary report
  - Excess emissions/CMS performance report
  - Startup, shutdown & malfunction (SS&M) report
- Operations & maintenance (O&M) plan

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Pre-evaluation Review 1

- O&M Plan
  - Affected sources & control devices
  - Monitored process & control device parameters, and established values
  - Procedures/schedule for monitoring parameters
  - O&M procedures for processes/controls/CMS
  - Maintenance schedule for processes/controls
  - Corrective actions for daily VE check
  - Procedures for annual kiln inspection
  - Periodic opacity monitoring procedures

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Pre-evaluation Review 2

- Excess Emissions and CMS Performance/Summary & SS&M Reports
  - Reported noncompliance & malfunctions
  - Corrective actions taken
  - Reported causes of excess emissions or CMS downtime
  - Changes in CMS, processes or controls
  - Have CMS in operation been recently certified?

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Pre-evaluation Review 3

- Performance Test Reports
  - Properly filed for adverse operations change?
  - Process & controls descriptions
  - Sampling locations, test procedures, results
  - Established compliance monitoring parameters, incl. temperature limit(s) for D/F
  - Compare plant compliance with limits
- Title V Permit
  - Operating parameters and restrictions
  - Site-specific standards
  - Most recent certification & semiannual reports
  - Has the plant done required testing and is it operating in accordance with the permit?

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Pre-evaluation Review 4

- Additional reports you may wish to request
  - ✓ Compare to identify emissions discrepancies:
    - Quarterly average CMS / CEM readings
    - Annual Emission Inventory Report
    - Stack tests conducted for last 10 years
  - ✓ Examine to identify plant changes that may also impact PSD, NSR, NSPS requirements
    - Capital authorization requests for last 10 years
    - Feasibility studies performed for last 10 years
    - Fuel and raw material usage for last 10 years
    - % sulfur (or sulfur product) in fuel, raw material, clinker, and cement kiln dust, and cement kiln dust quantity

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Pre-evaluation Review 5

- Other sources of valuable information
  - ✓ AFS data (OTIS)
    - Recent plant compliance history
  - ✓ Prior evaluation reports
    - Problems noted, violations found
  - ✓ State records on the plant
    - History of violations or problems with a piece of equipment
    - What the state has done
  - ✓ Portland Cement Alliance reports
    - Information on industry trends

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On-site Activity

- Entry conference
  - – Often records are not centralized, but kept at individual affected sources. Request that plant gather records & have them brought to you.
  - – Establish that you may be taking pictures and have the right to do so.
- Evaluation
  - – Look for changes in plant operation that might adversely affect emissions & necessitate another performance test.
  - – For a full compliance evaluation look at all components and emission points.
- Common violation
  - – Fugitive emissions from
    - Transfer points
    - Open storage facilities
    - Kiln/clinker cooler

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Detecting a Change in Operations 1

- Kiln production rate
  - Ask plant for
    - production rate during the performance test
    - monthly production rate over last 5 years, or
    - monthly/annual hours of operation and total production
    - stack test report showing production rate during the test
  - Compare these & look for inconsistencies
- Fuel usage
  - Ask plant for
    - records of fuel being fired by kiln
  - Look for trends or changes over the course of a month or year

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Detecting a Change in Operations 2

- Kiln gas routing
  - Ask plant for
    - capital authorization requests
    - explanation of gas routing (generally from raw material feed end of kiln or clinker cooler to raw mill or coal mill)
  - Review for plant configuration and possible changes
    - performance test process diagram & description in the test report
    - operations & maintenance (O&M) plan
    - capital authorization requests
  - Pay attention to any irregularities or inconsistencies

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On-site Record Checks 1

- Kiln, in-line raw mill/kiln, alkali bypass
  - Annual combustion system inspection
  - COM or daily 30 minute Method 9
    - ✓ If opacity > 20%
      - cause, times, corrective actions?
  - Continuous temp. monitoring & recording system
    - ✓ If kiln 3 hour rolling average temp. exceeds determined limit (D/F)
      - cause, times, corrective actions?

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On-site Record Checks 2

- Kiln, in-line raw mill/kiln, alkali bypass (contd)
  - For greenfield only, THC CEM
    - ✓ If 30 day block average > 50 ppmvd
      - cause, times, corrective actions?
  - PM & D/F performance testing
    - ✓ Retesting within 360 hours of change in operations adversely affecting compliance?
- Clinker cooler
  - COM or daily 30 minute Method 9
    - ✓ If opacity > 10%
      - cause, times, corrective actions?

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On-site Record Checks 3

- Raw & finish mills (major sources only)
  - Daily 6 minute Method 22 VE, Method 22 followup, 30 minute Method 9 sequence or COM or BLDS
    - ✓ Properly applied/operated?
    - ✓ If opacity >10%
      - cause, times, corrective actions?

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On-site Record Checks 4

- Raw material dryers, materials handling processes (major sources only)
  - Method 22 VE, Method 9 sequence – monthly, semiannually, annually
    - ✓ Properly applied?
    - ✓ If opacity >10%
      - cause, times, corrective actions?
  - For greenfield only, THC CEM
    - ✓ If 30 day block average > 50 ppmvd
      - cause, times, corrective actions?
- In general, CEM & CMS problems not yet reported

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Additional Inspector Resources 1

- Air Toxics Website – Rules & Implementation
  http://www.epa.gov/ttn/atw/eparules.html
- Air Toxics Website – Portland Cement
  http://www.epa.gov/ttn/atw/pcem/pcempg.html
- Online tracking information system (OTIS)
  http://www.epa.gov/idea/otis/caa_idea_query.html
  - Select IDEA Web Query, CAA (left navigation bar)
  - Enter SIC code for portland cement = 324
  - Select designation (major, etc.)
- Colorado Dept. of Public Health & the Environment Portland Cement MACT Guidance
  http://www.cdphe.state.co.us/ap/PCMlinks.asp

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Additional Inspector Resources 2

- Sector Notebook - Profile of the Stone, Clay, Glass and Concrete Industry
  http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/stone.html
- EPA Air Pollution Training Institute (APTI) – SI 431 unit on portland cement plants
  (Top page) http://www.epa.gov/oar/oaqps/eog/
  http://yosemite.epa.gov/oaqps/EOGtrain.nsf/DisplayView/NT00002E02?OpenDocument
- Portland Cement Association – incl. virtual plant tour and concrete basics
  http://www.portcement.org/index.asp

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Additional Inspector Resources 3

- Applicability Determination Index (ADI) - a database that contains memoranda issued by EPA on applicability and compliance issues
  http://www.epa.gov/Compliance/planning/data/air/adi.html
- Office of Compliance Inspector Web Site
  http://intranet.epa.gov/oeca/oc/campd/inspector/

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8. Recap

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Training Summary

In this training we've covered:

- Portland Cement MACT Subpart LLL
- Applicability, related requirements & key policy issues
- Emission limits, performance testing, notification & monitoring requirements
- Reporting & recordkeeping requirements
- Evaluation tips, including pre-evaluation review & on-site record checks

We request feedback on the success of this training and its usefulness to you, including its format, slides, and method of presentation.

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Affected Plant Components for Subpart LLL

Plant Component	PM, Opacity	D/F	THC
Kiln, In-line kiln/raw mill	Major sources	Major & area sources	New greenfield at major, area sources
Alkali bypass	Major sources	Major & area sources	New greenfield at major, area sources
Clinker cooler	Major sources		
Raw mills	Major sources		
Finish mills	Major sources		
Raw material dryers	Major sources		New greenfield at major, area sources
Raw material, clinker cooler, or finished cement storage bins	Major sources		
Conveying systems	Major sources		
Bagging systems	Major sources		
Loading/unloading systems	Major sources		

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Related Requirements Summary

Subpart	Affected plant components	Special considerations
Part 60 (NSPS) Subpart F	Area source plant components other than kiln, in-line kiln/raw mill	
Part 63 Subpart EEE	Kilns and in-line kiln/raw mills that burn hazardous waste	If a kiln stops burning hazardous waste it remains subject to Subpart EEE but is allowed to satisfy the monitoring requirements of Subpart LLL.
Part 60 (NSPS) Subpart OOO	Primary & secondary crushers (wherever located), or other equipment of an on-site nonmetallic mineral processing plant preceding portland cement plant raw material storage	
Part 60 (NSPS) Subpart Y	Coal mills	Kiln emissions used to dry the coal are regulated under Subpart LLL

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Portland Cement Key Policy Issues

- Performance Testing
- Alternative Monitoring
- Commingled Emissions
- Rerouted Emissions
- PM Continuous Emission Monitoring System (CEMS)
- Petroleum Coke Fuel

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Emission Limit Summary

Plant Component	PM	Opacity	D/F	THC
Kiln, In-line kiln/raw mill	0.15 kg/Mg dry feed	Opacity <= 20%	0.2 ng TEQ/dscm 0.4 ng TEQ/dscm	50 ppmvd for new greenfield
Alkali bypass		Opacity <= 20%		
Clinker cooler	0.05 kg/Mg dry feed	Opacity <= 10%		
Raw mill		Opacity <= 10%		
Finish mill		Opacity <= 10%		
Raw material dryer		Opacity <= 10%		50 ppmvd for new greenfield
Raw material, clinker cooler, or finished product storage		Opacity <= 10%		
Conveyor transfer points		Opacity <= 10%		
Bagging systems		Opacity <= 10%		
Bulk loading & unloading systems		Opacity <= 10%		

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Performance Test Summary

Pollutant	Components	Method or Monitor	Frequency
PM	New & existing kiln or in-line kiln/raw mill, and clinker cooler	EPA Method 5	Initially and every 5 years
Opacity	New & existing kiln or in-line kiln/raw mill (20%) and clinker cooler (10%)	COM or EPA Method 9	Initially at same time as Method 5
Opacity	New & existing raw & finish mills, raw material dryers & material handling processes (10%)	EPA Method 9	Initially and every 5 years
D/F	New & existing kiln or in-line kiln/raw mill	EPA Method 23	Initially and every 30 months
THC	New greenfield kiln or greenfield in-line kiln/raw mill	THC CEM	Initially

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Notification Requirements Summary

- Initial notifications
- Notification of performance tests
- Notification of opacity and visible emission observations
- Notification of continuous emission monitor performance evaluation date
- Notification of compliance status

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Monitoring Requirements Monitors & Methods Summary

Reqm't	Monitor	Method	Component	Source
Opacity	COM	9	Kiln, in-line kiln/raw mill, clinker cooler	major
VE	COM BLDS	22 9	Raw & finish mills	major
VE		22 9	Materials handling	major
D/F	Temp		Kiln, in-line kiln/raw mill	major area
THC	CEM		New greenfield Kiln, in-line kiln/raw mill, raw material dryer	major area

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Reporting & Recordkeeeping Requirements Summary

Reporting

- Report of performance test results, report of opacity/VE observations
- CMS performance evaluation
- COM performance evaluation
- Progress reports
- Startup, shutdown, or malfunction reports
- Summary report
- Excess emissions and continuous monitoring system performance report

Recordkeeping

- Retention periods and method of retention for MACT-required materials
- Records maintained for each affected source, incl. SS&M, maintenance, performance evaluations & observations
- Records maintained for each affected source with compliance monitoring system (CMS), incl. SS&M, measurements, excess emissions, repairs & QC

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Credits

We are indebted to assistance provided by the following individuals in the development of this training.

- Joe Wood, formerly OAR/OAQPS, for in-depth consultations on the fine points of the MACT, and for review of this material.
- Jerry Curtin, Region III, for the portland cement Adopt-a-MACT (draft), which provided insight into application of the MACT requirements, and for review of this material.

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Appendix A
Detailed Notification Requirements

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Notification Requirements Summary

- Initial notifications (§63.9(b-d))
- Notification of performance tests (§63.7, §63.9(e))
- Notification of opacity and visible emission observations per §63.1349 (§63.6(h)(5), §63.9(f))
- Notification of continuous emission monitor performance evaluation date (§63.8(e), §63.9(g), §63.10(e))
- Notification of compliance status (§63.9(h))

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Initial Notifications

- Initial notification if subject to Subpart LLL
  - Initial startup before 6/14/99, submit no later than 10/12/99.
  - Initial startup after 6/14/99, submit 120 days after becoming subject to this Subpart.
- Notification of intent to construct or reconstruct
  - If plan to construct or reconstruct a new affected source that is a major or area source of HAPs, submit as soon as possible before construction begins.
- Notification of startup
  - If have been required to submit a notice of intent to construct or reconstruct, deliver or postmark within 15 days after startup.

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Notification of Performance Tests

- Notification of intent to conduct performance test
  - If required to conduct a performance test, submit at least 60 days before the performance test is scheduled to begin (to allow for plan review and observation of test).
- Site-specific test plan
  - If requested by the regulatory agency, submit at least 60 days before the performance test is scheduled to begin, along with the notification of intent to conduct a performance test, or on a mutually agreeable date.
- Notification of rescheduling of performance test
  - If unable to conduct the performance test on the original date due to unforeseen circumstances, ASAP before the original test date, notify the regulatory agency and specify the rescheduled test date.

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Notification of Performance Tests 2

- Notification of rescheduling of performance test
  - If unable to conduct the performance test on the original date due to unforeseen circumstances, ASAP before the original test date, notify the regulatory agency and specify the rescheduled test date.

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Opacity and VE Notifications

- Notification of opacity and visible emissions (VE) observations
  - If required to conduct opacity or VE observations and required to conduct a performance test, submit along with notification of performance test at least 60 calendar days before the opacity/VE observations are scheduled to begin.
  - If required to conduct opacity or VE observations but are not required to or cannot, at that time, conduct a performance test, deliver or postmark the notification of intent to conduct the opacity or VE observations at least 30 days before they are scheduled to begin.

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CMS and COM Notifications

- Notification for sources with CMS
  - If intending to conduct a continuous monitoring system (CMS) performance evaluation, at least 60 calendar days before the scheduled beginning, submit notification including the date of the evaluation along with the performance test notification if conducting a performance test.
- COM performance evaluation
  - If required to install a continuous opacity monitor (COM) and using it to determine opacity compliance during a performance test, submit 2 copies of the written evaluation results at least 15 days before the performance test.

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Opacity and VE Notifications

- Notification of opacity and visible emissions (VE) observations
  - If required to conduct opacity or VE observations and required to conduct a performance test, submit along with notification of performance test at least 60 calendar days before the opacity/VE observations are scheduled to begin.
  - If required to conduct opacity or VE observations but are not required to or cannot, at that time, conduct a performance test, deliver or postmark the notification of intent to conduct the opacity or VE observations at least 30 days before they are scheduled to begin.

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CMS and COM Notifications

- Notification for sources with CMS
  - If intending to conduct a continuous monitoring system (CMS) performance evaluation, at least 60 calendar days before the scheduled beginning, submit notification including the date of the evaluation along with the performance test notification if conducting a performance test.
- COM performance evaluation
  - If required to install a continuous opacity monitor (COM) and using it to determine opacity compliance during a performance test, submit 2 copies of the written evaluation results at least 15 days before the performance test.

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Notification of Compliance Status 1

- Notification of compliance status incl. performance test results report
  - After a performance test conducted under Subpart LLL, submit before COB on the 60th calendar day following performance test completion.
- Notification of compliance status incl. CMS performance evaluation results report
  - After a CMS performance evaluation, submit with the CMS performance test report or if no performance test, before COB on the 60th calendar day following CMS performance evaluation completion.

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Notification of Compliance Status 2

- Notification of compliance status incl. opacity and VE observation report
  - For an opacity or VE observation conducted at the same time as the performance test, submit with the performance test results before COB on the 60th calendar day following test completion.
  - For an opacity or VE observation without a performance test, submit before COB on the 30th calendar day following the completion of observation.
- Notification of actual emissions data or other corrected information
  - For estimates or preliminary data or control efficiencies submitted in the application for approval of construction or reconstruction, submit with the first compliance status notification.

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Appendix B
Detailed Monitoring Requirements

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Monitoring Requirements

- Operations and maintenance (O&M) plan for all affected sources & control devices (§63.1350(a))
- New greenfield kilns, in-line kiln/raw mills, raw material dryers at major and area sources (§63.1350(h), (l))
  - Install, operate and maintain THC continuous emission monitor (CEM) in accordance with PS-8A; calculate 30 day block average THC concentration.

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Monitoring Requirements by Plant Component

- Operations and maintenance (O&M) plan for all affected sources & control devices (§63.1350(a))
- Kilns, in-line kiln/raw mills (including alkali bypass) & clinker coolers at major sources (§63.1350(c), (d), (j))
  - Either install, calibrate, maintain & operate continuous opacity monitor (COM) in accordance with general provisions & PS-1.
  - *Or* perform Method 9 visual opacity test daily for at least 30 minutes, kiln at representative conditions (for multiple stacks, monovent or COM infeasible).

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Monitoring Requirements 2

- Kilns, in-line kiln/raw mills (including alkali bypass) at major and area sources (§63.1350(f), (i))
  - Annual combustion system inspection.
  - D/F - install, operate, calibrate & maintain continuous temperature monitoring and recording system at PM control device (PMCD) inlet, calculate 3 hour rolling averages, verify temperature sensor calibration at least quarterly.
  - See §63.1350 (g) for activated carbon injection.

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Monitoring Requirements 3

- New greenfield kilns, in-line kiln/raw mills, raw material dryers at major and area sources (§63.1350(h), (l))
  - Install, operate and maintain THC continuous emission monitor (CEM) in accordance with PS-8A; calculate 30 day block average THC concentration.

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Monitoring Requirements 4

- Raw mills, finish mills at major sources (§63.1350(e), (j), (m) rev. 4/5/02, rev. 7/5/02)
  - Either daily 6 minute Method 22 visible emissions test with mill operating at representative conditions. If visible emissions (VE) are observed for any stack(s), initiate corrective action within 1 hour and conduct followup Method 22 test within 24 hours. If VE still observed conduct 30 minute Method 9 test.
  - *Or* install, calibrate, maintain & operate continuous opacity monitor (COM) in accordance with general provisions & PS-1.
  - *Or* install, adjust, maintain & operate bag leak detector system (BLDS) in accordance with §63.1350(m).

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Monitoring Requirements 5

- Raw material dryers, raw material storage, clinker, finished product storage bins, conveying transfer points (excluding those totally enclosed), bagging systems, and bulk loading and unloading systems at major sources (§63.1350(a)(4), (j))
  - Method 22 visible emissions (VE) test performed monthly, extended to semiannually and then annually for no VE observed over time. If VE observed during Method 22 test, then conduct 6 minute Method 9 test within 1 hour.
  - See §63.1350(a)(4)(vi, vii) rev. 12/6/02 for testing of transfer points located within a building.

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Appendix C
Detailed Reporting Requirements

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Reporting Requirements Summary

- Report of performance test results, report of opacity/VE observations
- CMS performance evaluation
- COM performance evaluation
- Progress reports
- Startup, shutdown, or malfunction reports
- Summary report
- Excess emissions and continuous monitoring system performance report

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Reporting Requirements 1

- Report of performance test results, report of opacity/VE observations
  - Submit with notification of compliance status (§63.1354(b), §63.10(d)(2), (d)(3)).
- CMS performance evaluation
  - With performance test results (§63.10(e)(2)(i)).
- COM performance evaluation
  - At least 15 days before the performance test (§63.10(e)(2)(ii)).
- Progress reports
  - As specified in written compliance extension, if given (§63.6(i), §63.10(d)(4)).

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Reporting Requirements 2

- Startup, shutdown, or malfunction reports
  - Semiannually when consistent with startup, shutdown, and malfunction (SS&M) plan
  - Within 2 working days when not consistent with SS&M plan + a letter explaining circumstances, reasons for not following the SS&M plan, and excess emissions or monitoring exceedances (§63.1354(b), §63.10(d)(5), §63.6(e)(3)).

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Reporting Requirements 3

- Summary report
  - Semiannually (§63.1354(b)(9), §63.10(e)(3)(vi, vii)).
- Excess emissions and continuous monitoring system performance report
  - Semiannually along with the summary report for any event when CMS data indicate noncompliance with emission limitations or operating parameters, or when system downtime for any CEM or CMS is 10% or greater (§63.1354(b)(8, 10), §63.10(e)(3)(i, vi, viii)).

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Appendix D
Detailed Recordkeeping Requirements

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Recordkeeping Requirements Summary

- Retention periods and method of retention for MACT-required materials
- Records maintained for each affected source, incl. SS&M, maintenance, performance evaluations & observations
- Records maintained for each affected source with compliance monitoring system (CMS), incl. SS&M, measurements, excess emissions, repairs & QC

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Recordkeeping Requirements 1

- Retention for MACT-required materials
  - At least 5 years from the date of each occurrence, measurement, maintenance, corrective action, notification, report, or record
  - Most recent 2 years retained onsite, remaining 3 years may be kept offsite
  - May be maintained on microfilm, a computer, floppy disks, magnetic tape, or microfiche (§63.1355(a), §63.10(b)(1))

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Recordkeeping Requirements 2

- Maintain records for each affected source
  - Startup, shutdown, operational malfunction
  - Air pollution control equipment malfunction
  - Air pollution control equipment maintenance
  - Variations from startup, shutdown, and malfunction plan (SS&M)
  - Demonstrations of conformance with SS&M
  - Periods of CMS malfunctioning or inoperative (§63.1355(b), §63.10(b)(2))

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Recordkeeping Requirements 3

- Maintain records for each affected source
  - Results of performance tests, CMS performance evaluations, opacity/VE observations
  - CMS calibrations, adjustments, maintenance (§63.1355(b), §63.10(b)(2))
  - Documentation supporting initial notifications and notifications of compliance status (§63.1355(b)(1), §63.9)
  - Applicability determination, incl. supporting analyses (§63.1355(b)(2), §63.10(b)(3))

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CMS Recordkeeping Requirements 1

- Maintain records for each affected source with compliance monitoring system (CMS) (§63.1355(c), §63.10(c))
  - All required CMS measurements, incl. data recorded during breakdowns and out of control periods
  - Date and time for each period CMS was inoperative except for zero (low-level) or high level checks
  - Date and time for each period CMS was out of control

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CMS Recordkeeping Requirements 2

- Dates and times defining each period of excess emissions and parameter monitoring exceedances for all periods, incl. startups, shutdowns & malfunctions
- The nature and cause of any malfunction (if known)*
- The corrective action taken or preventive measures adopted after malfunction*

* may use the SS&M plan instead, if inclusive

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CMS Recordkeeping Requirements 3

- The nature of repairs or adjustments to the CMS that was inoperative or out of control*
- The total process operating time for the reporting period
- Quality control program procedures under §63.8(d), incl. a written protocol for these operations for each CMS:
  a) Initial and subsequent calibration of the CMS
  b) Determination and adjustment of CMS calibration drift

* may use the SS&M plan instead, if inclusive

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CMS Recordkeeping Requirements 4

- Quality control program procedures under §63.8(d), incl. a written protocol for these operations for each CMS (continued):
  - c) Preventative maintenance of CMS, including spare parts inventory
  - d) Data recording, calculations, and reporting
  - e) Accuracy audit procedures, including sampling and analysis methods
  - f) Program for correcting a malfunctioning CMS

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